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W.D. Farnell

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THE GREENHOUSE HANDBOOK OF NUCLEAR EXPLOSIONS(U)

PART I - THEORY

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Edited By

B. R. Suydam

By Authority of U. S. Atomic Energy Commission
Per Walter F. McKee 3/27/51
Doc. No. XXVII-2380-7A

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GREENHOUSE HANDBOOK I

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INTRODUCTION

Since the Sandstone tests in 1948, considerable advancement has been made in the design of fission weapons.

[Redacted]

Design work is advancing

on even smaller systems.

[Redacted]

The

basic soundness of such advanced designs has been amply demonstrated by the five shots of the Ranger program, conducted in Nevada in January and February, 1951. It was hoped that this Handbook might contain the results of the Ranger program, but this has for the most part proved unfeasible.

Concurrently with the development of smaller fission weapons, the Los Alamos Scientific Laboratory has been advancing in its work on a Super bomb. In this field, theoretical studies have advanced to the point where the experimental study of a simple thermonuclear reaction becomes necessary.

[Redacted]

A full list of acknowledgments for this Handbook would read like a list of the members of the Los Alamos Scientific Laboratory. For

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the most part, material has been quoted from many sources without specific mention. Of particular value in the preparation of this volume have been the Los Alamos Technical Series and the many volumes of the Scientific Director's Report of Operation Sandstone. In addition to those whose names appear as authors of particular chapters of this Handbook, the following have given unusual assistance in its preparation in the way of advice and criticism: David B. Hall, William E. Ogle, Harris Mayer, Frederick Reines, Leslie B. Seely, and Bob E. Watt. Without their assistance, this volume could not have been written.

B. R. Suydam

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CHAPTER 1

PURPOSE OF THE TESTS

B. R. Suydam

The broad objectives of the 1951 Greenhouse test program are three in number, namely: (1) to test fission weapons of advanced hydrodynamical design with the end in view of improving our stockpile, (2) to make an experimental study of thermonuclear reactions in their simplest form, and (3) to enlarge our knowledge of the effects of nuclear weapons. The purpose of this Handbook is to outline how these three objectives will be met.

1.1 TESTS OF FISSION WEAPONS

The Los Alamos Scientific Laboratory has undertaken the development of fission weapons with external dimensions smaller than those of the present stockpile model.

These results depend, of course, on the assumption of perfect symmetry, on perfect initiation, and on our knowledge of the equation of state



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CHAPTER 2

DESCRIPTION OF THE MODELS

B. R. Suydam

2.1 INTRODUCTION

The purpose of this chapter is to describe the physical characteristics of these bombs and to give the predictions of their behavior. The predictions will be given for the most part in the form of graphs which depict the results of calculations made by various sections of T-Division. Every member of T-Division has had a hand in these calculations at one point or another, so the author acknowledges his debt to this division as a whole rather than listing individual names.

2.2 THE MODELS TO BE FIRED

At the time of writing the decision is not firm whether the Booster will be fired. Because this shot may be fired, we shall discuss it here.

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